FLORENCE COPPER

FLORENCE COPPER INC.
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September 24, 2020

Ms. Nancy Rumrill
U.S. Environmental Protection Agency, Region 9
Drinking Water Protection Services, WTR-3-2
75 Hawthorne Street
San Francisco, California 94105

Re: Transmittal of Supplemental Information in Support of Application for Underground Injection Control Permit, Florence Copper Project, Florence, Arizona

Dear Ms. Rumrill:

Pursuant to our telephone conversation on September 17, 2020, Florence Copper Inc. (Florence Copper) herewith transmits supplemental information in support of our application for an Underground Injection Control (UIC) Permit submitted to the U.S. Environmental Protection Agency (USEPA) on October 4, 2019 (Application). The information transmitted herewith reflects our understanding of and response to questions the USEPA has regarding previously submitted Application materials.

Each of the sections below begins with our stated understanding of the additional information required by the USEPA, followed by our response, which includes references to the attached materials.

Request 1:

The USEPA requested additional information regarding the configuration of perimeter, observation, and Point of Compliance (POC) wells for the purpose of demonstrating hydraulic control.

Response 1:

Florence Copper has proposed to install a ring of perimeter wells at the edge of the active In-Situ Copper Recovery (ISCR) wellfield which will be pumped to maintain hydraulic control. A ring of observation wells will be installed outside of the ring of perimeter wells for the purpose of monitoring groundwater elevations to demonstrate hydraulic control. Because the perimeter and observation wells are installed in relatively close proximity to one another, and the ore body has relatively high hydraulic conductivity, pumping conducted at the perimeter wells has the potential to draw down the water level in the observation wells by a similar amount to that observed in the perimeter wells. For this reason, Florence Copper has proposed that POC wells be used to monitor daily water levels for use in analysis of hydraulic control. The groundwater elevation measured at the POC represents background groundwater elevation for each day of monitoring, and will reflect seasonal changes of groundwater elevations, facilitating consistent analysis of the groundwater flow toward the wellfield. By contrast, Production Test Facility (PTF) operations did not include daily monitoring of background groundwater elevations, consequently, groundwater elevation changes derived from operational conditions and regional scale seasonal changes

could not be readily distinguished. Figure A-19 shows the typical configuration of the ISCR wellfield, perimeter, observation, and POC wells during the first year of planned ISCR operations.

As shown on Figure A-19, there are a greater number of POC wells down gradient of the ISCR wellfield, which is appropriate both for monitoring groundwater quality and for supporting analysis of hydraulic control. The natural groundwater flow direction is toward the northwest, and results in natural inward groundwater flow on the southeastern side of the ISCR wellfield. On the northwestern or down gradient side of the wellfield the greater number of POC wells will be used to demonstrate that pumping conducted in the ISCR wellfield has overcome the regional groundwater flow gradient. As the wellfield expands in subsequent years, the perimeter and observation wells will move outward, maintaining the same spacing as shown on Figure A-19.

Florence Copper understands that USEPA may propose a groundwater gradient requirement of 0.01 feet/foot between recovery and observation wells as a demonstration of hydraulic control. Establishing a gradient requirement of this type has the effect of making the formation hydraulic conductivity a permit limitation. As planned, the recovery, perimeter, and observation wells will be installed at regular intervals. However, because the hydraulic conductivity of the formation is not uniform, the gradient observed between wells installed at a regular spacing and pumped at similar rates will have different hydraulic gradients between the pumping and observation pairs. In areas where the hydraulic conductivity is relatively high, the water level in the observation well may draw down by a similar amount as the recovery/perimeter well, making the gradient demonstration difficult to achieve, regardless of how much excess water is pumped. In areas where the hydraulic conductivity is lower, the gradient demonstration can be achieved with relatively less pumping.

The hydraulic control monitoring proposed by Florence Copper, and accepted by the Arizona Department of Environmental Quality (ADEQ), includes daily water level monitoring at the recovery, perimeter, observation, and POC wells for the purpose of demonstrating drawdown at the edge of the ISCR wellfield, and to demonstrate the relationship between that drawdown and regional groundwater elevation conditions.

Request 2:

The USEPA requested additional information regarding the planned method for daily analysis of specific conductance at the observation wells located at the edge for the ISCR wellfield.

Response 2:

Florence Copper plans to monitor specific conductance at the observation wells using dedicated electronic instruments installed in each observation well. The sensors will be connected to the wellfield control center, allowing automated data collection and analysis. Although the specific conductance will be regularly monitored using the dedicated instruments, it is anticipated that the instruments will periodically require maintenance, calibration, or replacement. Consequently, Florence Copper will collect daily fluid samples from the affected observation wells during these maintenance events to demonstrate compliance with specific conductance requirements set forth in the UIC permit.

Please contact me at 520-316-3710 if you require any additional information.

Sincerely,
Florence Copper Inc.

Brent Berg
General Manager

cc: Maribeth Greenslade, Arizona Department of Environmental Quality

Enclosures
- Exhibit D-7: Discharge Limitations, Monitoring Requirements, and Alert Levels
- Figure A-18: Planned Rinsing Sequence
- Table 13: Quarterly Groundwater Compliance Monitoring
- Table 14: Annual Groundwater Monitoring
- Draft Permit